straw stack we had seen the moment before came rushing back at us. This point is not clear, however, and there is a difference of opinion among the members of the party. About half an hour after we landed, a thunderstorm broke upon us, giving a heavy precipitation of rain, snow, and hail. The wind during the occurrence of the heavy precipitation seemed to come from the east-southeast. It is possible that we were caught in the squall ahead of the thunderstorm, and this may have been responsible for the capricious conduct of the balloon just before landing.

It may seem that this discussion of our probable path is based upon rather uncertain evidence. Yet, in spite of the fact, I feel very confident of the conclusions. Apparently the distance traversed by the balloon was about 400 kilometers. This yields an average speed of about 20 meters per second. About 12 hours after the journey began, the Drexel, Nebr., Aerological Station obtained a wind of 31 meters per second from the south-southwest at an altitude of 500 meters. Wind speeds of from 10 to 15 meters per second were recorded at the Ellendale, N. Dak., Aerological Station during the time that we were in the air, although we do not have data from that station for the altitudes at which the balloon rode. The projection of our path, then, seems entirely in accord with all the observed phenomena of the trip. There is a very decided charm about being suspended in the air, especially when one is uncertain as to his location, and when one does not know his speed. This journey did more than provide those thrills; it enabled us to actually penetrate and become a part of the wind circulation of a strong cyclone.*

WEATHER DURING SOME NOTABLE AIRSHIP VOYAGES.

(1) In an account of the 4,500-mile trip of the German Zeppelin, *L 59* from Bulgaria to the Sudan and return, one of the crew makes the following mention of the weather:

"While we experienced on the afternoon of November 23 [1917], at an altitude of 7,500 feet [over the Libyan desert south of the oasis of Farafrah], a temperature of 32° C., and wore tropical uniforms, ten hours later we had to put on our leather suits, as the temperature had dropped to 12° C. [near (?) the Nile Delta]."—Abstract from Aviation, Mar. 1, 1919, pp. 158–159.

(2) In a trip of a large dirigible from Rome to England, October 29 to November 1, 1917, much unfavorable weather was encountered. From Rome to Marseilles, "very bumpy weather was experienced over Civita Vecchia [west coast of Italy], and later on a rainstorm was encountered." In the stage from Marseilles to Paris "there was a head wind against which they made poor progress."—Abstract from Aviation, Mar. 1, 1919, pp. 158–159.

(3) "In spite of encountering rain, high winds, snow, and extremely low temperatures in cruising up and down the [Atlantic] coast [of the United States], February 26–28, 1919, Ensign C. W. Tyndall established a new endurance record for the nonrigid type of balloon, remaining aloft for 33 hours and 6 minutes."—Aerial Age Weekly, Mar. 3, 1919, p. 1265.

(4) A record airship voyage, and what is described as one of the most notable cruises ever undertaken by airship, was accomplished over the North Sea by *N. S. 11*, one of the British non-rigid type. The voyage took the form of a circuit, which embraced the coasts of Denmark, Schleswig-Holstein, Heligoland, North Germany, and Holland, and the most unfavorable weather conditions were met with. The total length of the round trip was 1,285 miles, and the time occupied was 40½ hours.

"The important point about this cruise is not only the distance covered and the long time the vessel was afloat, but her airworthiness in conditions of the most trying character. Starting from the Firth of Forth at 3.45 p. m. on March 18, the first 280 miles were covered easily with only a departure of about a mile from her course. Gradually the wind grew stronger and rougher, and when one engine broke down it seemed doubtful whether the ship could reach the English coast. When, however, it did finally reach the north foreland, petrol was running short owing to the necessity of running at full power earlier in the voyage, and one engine only was running, this on five cylinders out of six."—Aeronautics, Mar. 27, 1919, p. 328.

(5) The naval dirigible *C–5*, which made a successful flight from Montauk Point to St. Johns, Newfoundland, May 14–15, remained in the air continuously for 25 hours and 40 minutes. This flight of 1,115 miles nearly equaled the above record for non-rigid airships for total distance covered without a stop. In speaking of the flight, Lieut. Commander E. W. Coil said: "Our troubles started just after midnight, when the sky became overcast. Before then we had been flying under a full moon at an altitude of 1,000 feet. We lost our bearings while approaching Little Miquelon Island, off the south coast of Newfoundland, about 170 miles from St. John's. We made a 'landfall' at St. Pierre, * * * [and went] 'cross lots' to * * * St. John's. * * * There was considerable fog, but it did not trouble us." A perfect landing was made. Later, the dirigible breaking away a second time in a gusty wind, drifted out to sea and was lost.—Abstract from Aerial Age Weekly, May 26, 1919, p. 533; and Aviation, etc., June 1, 1919, pp. 475–476. (Further notes will appear in the May REVIEW.)—*C. F. B.*

* The meteorological results of the flights of two balloons, starting from Fort Omaha, at the same time, one attempting to hold an altitude of 5,000 feet, and the other 10,000 feet, will be published in a later issue of the REVIEW.—ED.